QuickStart Guide to the QVGA Starter Kit

Thank you for purchasing a QVGA Controller Starter Kit. This document:

- ⇨ Lists the components shipped with your order;
- ⇨ Tells you how to install and use the Mosaic IDE on your PC;
- ⇨ Directs you to helpful documentation installed with the Mosaic IDE on your PC; and,
- ⇨ Introduces Kernel Extension device drivers and explains how to use them.

Included with Your QVGA Starter Kit

Included with your QVGA Starter Kit are several components that assist you in developing on your controller. You should have all of the components listed below; if any are missing, please contact us immediately:

1. One QVGA (Part No. QVGASK). Your QVGA includes 384K Flash memory and 256K RAM.
2. One 14-volt, 1-amp wall-mount power supply;
3. Extra jumper shunts for configuring jumpers on the QVGA;
4. One 9-pin serial cable for connecting to your PC;
5. One CD containing the Mosaic IDE software and documentation;
6. This document; and,
7. A packing list.

Installing and Using the Mosaic IDE

Your Mosaic Integrated Development Environment (IDE) provides all the tools you need to write, compile and download either Forth or C programs to your QVGA. Through it you can also communicate with your embedded controller, examine or actuate any I/O, execute any portion of your code, and interactively debug code. If you have any questions or encounter any difficulty getting started, please don't hesitate to contact us at (510) 790-8222.

The Mosaic IDE is provided on an installation CD-ROM. To install it onto your PC, first insert the Installation CDROM into your CD Drive. If the installer does not launch automatically, browse to your computer's CD drive using the 'My Computer' icon and double click on 'Setup.exe' to manu

ally launch the installer. We recommend that you use the default installation directory ("C:\Mosaic\") and choose 'Typical Setup' when asked. If you wish to install into a different directory, you may type in any pathname *provided that it does not contain any spaces*. The 'Custom' setup option can be used if another version of either TextPad, the Mosaic Terminal, or an earlier version of the IDE had already been installed. However, the IDE requires all of its components to work properly so we recommend that you choose 'Typical Setup'. Please call us if you encounter any difficulties during the installation.

When the installation is complete, you will need to restart your computer unless you are installing onto a Windows 2000 machine. Be sure to choose 'Yes' when asked to restart – if you don't, the installation may not complete properly. If you choose 'No' and restart later we recommend that to assure a full restart you fully shutdown your computer and restart it; lesser restarts don't always do the job. You are now ready to use the Mosaic IDE!

Using the Mosaic IDE

The Mosaic IDE has two main components, the TextPad editor and the Mosaic Terminal serial terminal program, both of which you'll find in the default directory "C:\Mosaic\":

- TextPad is a very powerful and highly configurable text and program editor. If you are programming in Forth, you can use it to write your code. If you are programming in C, all of the functions of the C compiler tools are available through the controls in TextPad. You can launch TextPad from the 'Mosaic IDE' group in the 'Programs' section of your Windows 'Start' menu. For convenience, you may want to place a shortcut to it on your desktop or on your Windows Taskbar.
- The Mosaic Terminal is a serial communications terminal that allows you to interactively control your QVGA Controller, or other QED-based microcontroller over its RS-232 interface. Forth programmers can use it to download their code to the controller where it is compiled directly into memory. C programmers can use it to download compiled C programs into the FLASH memory of the microcontroller. The terminal may be launched from the 'Mosaic IDE' group within 'Start→Programs', but it is also available from within TextPad, either from the 'Tools' dropdown menu or by clicking the terminal icon on TextPad's toolbar. When you launch the terminal for the first time, check the communications settings (Settings→Comm) to verify that the serial port is set correctly for your computer.

To get started programming your QVGA Controller please read the first few chapters of the "C Programmers Guide to QVGA Controller" (or for Forth programmers, the corresponding document), which you can find on your CD or on your C: driver after installing the Mosaic IDE.

Documentation for the QVGA

If you program in the C language, you can find the documentation the directory

```
C:\Mosaic\Documentation\QVGA Controller\For C Programmers
```

If you program in the Forth language, you should consult "ReadMe.txt" found in the directory:

```
C:\Mosaic\Documentation\QVGA Controller\For Forth Programmers
```

There are several documents you'll find particularly useful:

- *C Programmers Guide to QVGA Controller* provides comprehensive information about programming the *QVGA*, configuring its options, using its I/O and more. In particular, you can find,
  - Detailed electrical specifications in its Appendix A,
  - Pin-outs for all connectors on the *QVGA* in Appendix B; and,
  - You can consult the *QVGA Schematics* to answer any detailed questions about the hardware and circuitry. These schematics are found in Appendix C.
- The *Control-C Function Reference.pdf* provides a glossary list of all the QVGA's built-in functions.
- The *GUI Toolkit Glossary for C Users.pdf* provides a glossary list of all the GUI Toolkit functions.

Documentation for WildCards

WildCards are small, specialized I/O boards. You can plug in up to seven WildCards onto your QVGA. You can find individual manuals for each WildCard in the directory:

```
C:\Mosaic\Documentation\Wildcards
```

Each WildCard requires its own driver routine, called a Kernel Extension.

Using Kernel Extensions

A *Kernel Extension* is a modular pre-built runtime library that enhances the QVGA's features and capabilities by providing device drivers or other useful functions. Device drivers for Mosaic's WildCards, small I/O boards that directly plug-in to the QVGA, are provided as kernel extensions. These enhancements are accessible from either the C or Forth language. To obtain Kernel Extensions for your Wildcard(s), you need to use our online tool, the *Kernel Extension Manager*. The Kernel Extension Manager is available at:

```
http://kxmanager.mosaic-industries.com/kem
```

This URL is somewhat difficult to remember, so we recommend that you bookmark it.

To build kernel extension libraries you don't need any special software on your PC aside from the Mosaic IDE that you use for all QVGA software development. Just go to the above URL to get started.

When you access the page, you will see a list of product configurations. Your selection tells the Kernel Extension Manager what kind of memory and kernel configuration reflects your hardware. If you are uncertain as to which one applies to you, feel free to call us for assistance. After you have chosen a hardware configuration, you will see a table listing the available kernel extensions for your

chosen profile. To learn more about a particular kernel extension, click its name to see a short description appear above the table. When you have decided which kernel extensions you would like to use, check off your choices in the table and click the *Build Packages* button. The process may take up to a minute. If it is successful, you will see some reporting output and a link at the bottom of the page to "packages.zip". When you click this link, you should be presented with an option to download the zip file to your computer. Once you have downloaded the file, open it with a zip utility such as WinZip (available at www.winzip.com).

The packages.zip file contains five files:

1. **`install.txt`** – The Flash install file. You must download this file to QVGA once to install the additional software in its Flash memory. It is typically not necessary to reinstall the kernel extensions unless you have regenerated them with the Kernel Extension Manager.
2. **`library.4th`** – This Forth library file is used only if you are programming in Forth. Download this file before your own application software. It must be downloaded again after a **`COLDSTART`** unless you recover using **`RESTORE`**. This file establishes a memory map and creates the Forth driver routine names needed by your application.
3. **`library.h`** – The C Header file, used only for C programs. You must **`#include`** this file in your C application prior to #including **`library.c`**. Any additional source code files that use routines from the kernel extensions must **`#include`** the **`library.h`** file only. There must be exactly one instance of **`#include library.c`**.
4. **`library.c`** – The C Library file, used only for C programs. This file contains function definitions that invoke the underlying code of the kernel extensions. You must **`#include`** it exactly once in your source tree, and then **`#include library.h`** in any source files that use the functions of the kernel extensions. Also, be sure to **`#include library.h`** prior to #including **`library.c`**.
5. **`readme.txt`** – The readme file. Be sure to read this file carefully. It contains more detailed install instructions, and each kernel extension's readme text.

For Further Help

If you have any questions, feel free to call us at (510) 790-1255.